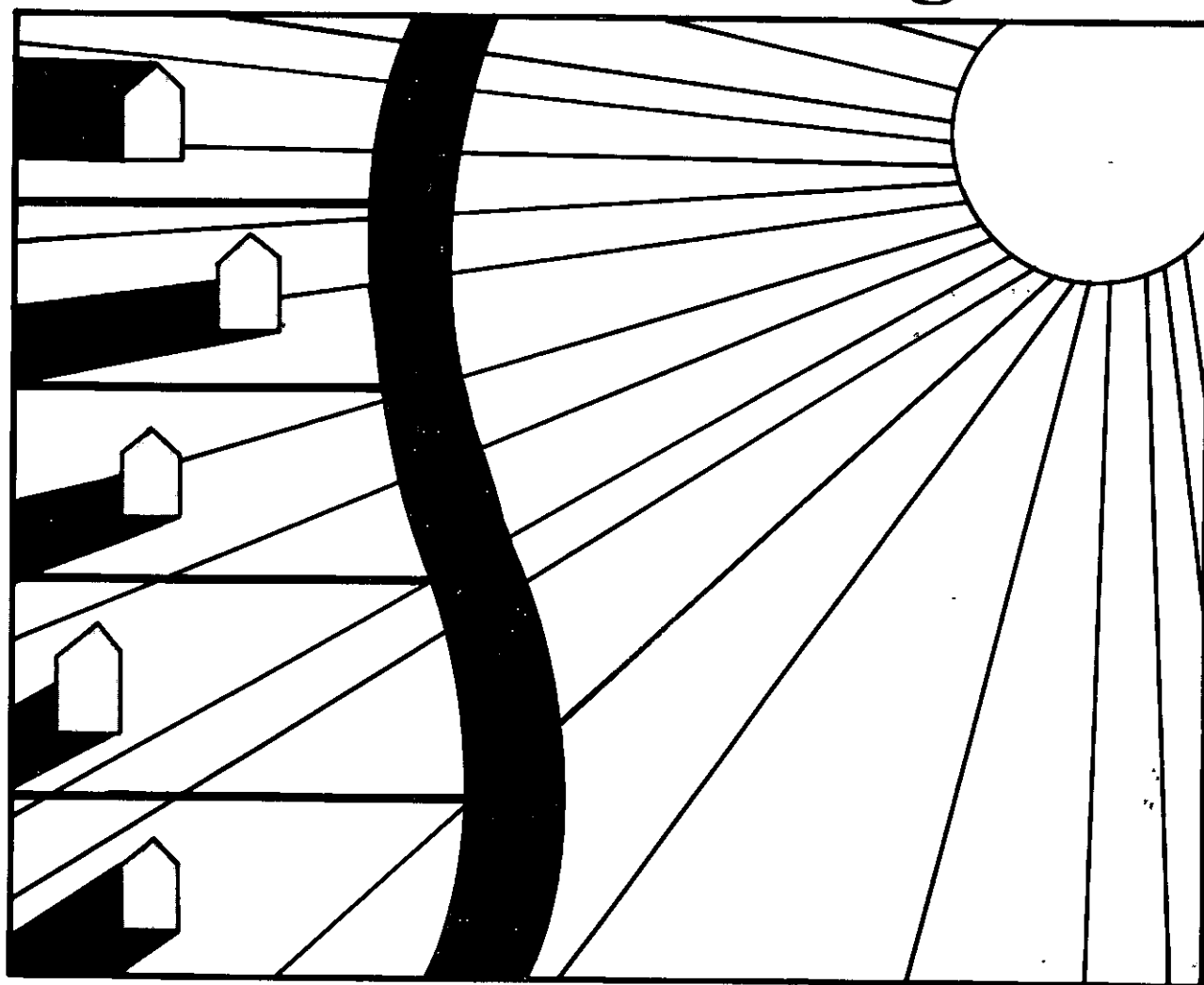


*Operation
SOLAR*

**Regulating
Passive
Solar
Subdivision
Design:**



Tips for Planning and Zoning Commissions

Regulating Passive Solar Subdivision Design:

Tips for Planning and Zoning Commissions

Table of Contents

Preface	1
1. Require a Consideration of Passive Solar Energy Techniques in Subdivision Design	1
2. Encourage East-West Layouts	2
3. Provide for Flexible Lot Layouts	2
4. Require Proposed Buildings to be Shown on the Subdivision Map	3
5. Require Developers to Consider the Energy Impacts of Vegetation	3
6. Where Appropriate, Require Septic Systems to be Sited on the South Side of the Dwelling Unit	3
7. Require Solar Access Protection to be Considered In the Siting of Houses	4
8. Require Solar Easements as a Condition of Subdivision Map Approval	4
9. Temper the Considerations of Solar Design With Their Impact on Housing	5

Introduction

In 1981 Northeast Utilities (NU) introduced an energy conservation plan which became known as NU 80s/90s. The overall goals of the plan are to reduce NU's use of oil for generation and to hold the growth rate in electric use to 1.5 percent per year or less.

The use of alternatives to conventional energy forms is an important part of NU 80s/90s.

Operation SOLAR is the program which seeks to promote the use of both active and passive solar energy by identifying feasible and economic applications. Energy Management Services (EMS) energy consultants offer technical assistance and information to those NU customers and builders/developers who are considering the solar alternative.

Preface

Local governments in many parts of the United States are beginning to understand that zoning and subdivision regulations can play an important role in promoting the use of solar energy. The experiences of local governments which have studied solar energy have revealed that solar energy can be protected through local land use regulations in two ways:

1. By removing legal and institutional barriers to the installation and use of solar energy systems and by
2. Encouraging or requiring the use of solar energy or solar subdivision design.

In order for a community to develop in harmony with its solar energy resources, a special assessment should be made of the community's zoning and subdivision regulations to determine what legal constraints might discourage or prohibit solar energy systems (i.e. prohibiting a solar collector on a rooftop) or discourage or prohibit solar subdivision design (i.e. discouraging street layouts that consider access to sunlight).

In Connecticut, this special assessment of local zoning and subdivision regulations has become an urgent matter as a result of Public Act 81-334 (an act concerning passive solar design for subdivisions). This legislation makes solar subdivision design a matter of statewide significance since it requires every planning commission in the state to adopt "solar

conscious" subdivision regulations by October 1, 1981. As of January 1983, very few municipalities in Connecticut had complied with this mandatory land use law. In some cases, planning commissions are not aware that it is mandatory legislation; in other cases, planning commissions are unsure how to regulate solar subdivision design. With all of this confusion, it is clear that many Connecticut planning commissions are in need of some clear-cut guidelines for encouraging solar design through subdivision regulations.

In contrast in the state of Massachusetts there is no legislative mandate for solar subdivision design. Nevertheless, despite a lack of mandate it is clear that Massachusetts planning boards have ample discretionary authority to create solar subdivision regulations under current state enabling legislation.

For this reason a description of key planning tools that can be used to create solar subdivisions should be useful to any Massachusetts municipality that decides to take a leadership role in the development of solar energy. Here are a few important factors that must be considered by any Connecticut municipality and that should be considered by any Massachusetts municipality when amending subdivision regulations to include solar design issues:

1. Require a Consideration of Passive Solar Energy Techniques in Subdivision Design

By law, every subdivision regulation in Connecticut must be amended to require any person submitting a subdivision plan to demonstrate that he had considered passive

solar energy techniques which would not significantly increase the cost of housing to the buyer after tax credits subsidies and exemptions. Specifically passive solar energy

techniques have been defined to include but not be limited to site design techniques such as:

a) house orientation; b) street and lot layout; c) vegetation; d) natural and manmade topographical features and the protection of solar access within the development.

While these requirements do not apply in

the state of Massachusetts, they should still be seriously considered by any municipality that wishes to enact a comprehensive solar subdivision legislation. In this sense the ordinance language which follows should be adaptable to both Connecticut and Massachusetts enabling legislation.

Passive Solar Energy Techniques:

The applicant shall utilize passive solar energy techniques which maximize solar heat gain, minimize heat loss during the heating season and minimize heat gain and provide for natural ventilation during the cooling season. These passive solar energy techniques shall include but are not limited to the following:

2. Encourage East-West Layouts

Subdivision regulations already regulate the design and layout of streets. However, most planning commissions do not utilize the street planning and design standards contained in the regulations as a tool for encouraging solar conscious street orientations. In order to encourage solar design, it is useful to amend subdivision standards for street design to encourage east-west streets (with a maximum

deviation of 30 degrees on either side of true east), wherever soil conditions, topography and access and alignment with existing street systems permit. Where an east-west street orientation standard is not acceptable, then an alternative approach is to encourage north-south and east-west streets so that developers have a variety of street design options.

The street and lot layout plan shall, as far as practicable, provide for east-west street orientations to facilitate the development of properly oriented passive solar buildings. For purposes of this regulation an east-west street refers to any street with its axis within 30 degrees of true east.

3. Provide for Flexible Lot Layouts

Perhaps one of the more obvious legal barriers to solar design are local regulations requiring the side lot lines to be perpendicular to the street line. This subdivision standard can constrain solar subdivision design when streets run intercardinally (i.e. north-east to south-

west). In these cases, it may be useful to allow developers the option of varying the lot line orientation if the purpose of the variance is to offer the future homeowner greater control over vegetation and buildings to the south.

In so far as practicable, side lot lines shall be perpendicular to the street line unless that purpose of the lot line orientation is to provide greater solar access protection.

4. Require Proposed Buildings to be Shown on the Subdivision Map

A planning commission can encourage solar subdivision design by requiring the developer to site proposed buildings on the best sites for solar energy. This requirement is already used by a number of Connecticut planning Commissions to make developers aware of the importance of proper building orientation to the sun. This requirement does not bind the

homeowner to build on the spot shown on the subdivision map. It merely makes the homeowner aware that any other location or orientation may not be so good for utilizing solar energy. In this sense, requiring that proposed buildings be located and oriented for maximum use of solar energy is a form of consumer protection.

The proposed principal building shall be located and oriented so that the longest side of the building faces within 30 degrees of true south.

5. Require Developers to Consider the Energy Impacts of Vegetation

A "solar-conscious" subdivision regulation should encourage the retention of vegetation where it helps to buffer winter winds and block unwanted summer sun. However, vegetation which blocks a building's access to sunlight

during the heating season is not desirable. Planning commissions should encourage developers to subdivide land with the objective of offering as many lots as possible having access to sunlight.

Proposed buildings shall be located to avoid shadows cast by other buildings, vegetation and natural and manmade topographical features wherever practicable.

6. Where Appropriate, Require Septic Systems to be Sited on the South Side of the Dwelling Unit

Where soil conditions permit, subdivision regulations should require septic system

drainage fields on the south side of proposed dwelling units since this will result in the

elimination of any vegetative obstructions on the south side of the house. Several Connecticut municipalities have adopted this requirement

and found it to be one of the most important land use tools for protecting solar access.

Provided soil and topographic conditions permit primary and reserve leaching fields shall be planned and located to the south of a proposed house location whenever such location enhances solar access to the south wall due to regrading and tree removal associated with the installation of the sewage disposal system.

7. Require Solar Access Protection to be Considered In the Siting of Houses

Proposed house locations should be separated sufficiently far apart so that one house within a development does not shade another. A number of Connecticut municipalities have adopted a solar access policy within their subdivision regulations. These policies generally state that solar access should be available to the south wall of the

house between 9:00 a.m. and 3:00 p.m. local time on December 21. Recognizing the potential problems associated with overregulating shadows, most towns allow houses to be shaded for 10 percent or 25 percent of the time on the worst day of the year for sunlight (on December 21).

Each lot within the subdivision shall be evaluated to determine if south wall solar access protection is available meeting the solar access requirements of the zoning regulations.

8. Require Solar Easements as a Condition of Subdivision Map Approval

Some communities have taken a bold step to protect solar access by requiring solar easements with the deeds of each lot. Planning commissions have the authority to determine if

solar easements should be imposed and to condition approval of the subdivision map on the inclusion of solar easements with each building lot.

At the discretion of the commission, taking into consideration the need for solar access protection, the applicant shall be required to include solar easements or restrictive covenants with the deeds of each lot.

9. Temper the Considerations of Solar Design With Their Impact on Housing

Solar subdivision design is not intended as a tool to raise housing costs or make it more difficult to comply with local regulations. While a subdivision regulation should include provisions for all of the passive solar energy techniques mentioned above, these provisions should be flexible. To the extent practical, developers should be encouraged to have

preliminary discussions of their subdivision plan so that solar considerations can be incorporated into the design at the earliest stages of developments. This will avoid expensive revisions to the subdivision map and minimize or eliminate the cost associated with the use of solar design concepts.

The material for this booklet was prepared for NU by Charles Vidich of Charles Vidich Associates, Stafford Springs, Connecticut. Mr. Vidich is also the principal planner for the Central Naugatuck Valley Regional Planning Agency in Waterbury, Connecticut.

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